Rocks and Minerals

PUBLISHED MONTHLY

Edited and Published by PETER ZODAC

JUNE 1940

Contents for June, 1940

Entered as second-class matter September 13, 1926, at the Post Office at Peekskill, N. Y., under the Act of March 3, 1879.

Specially written articles (as contributions) are desired.

Subscription price $2.00 a year; Current numbers, 25c a copy. No responsibility is assumed for subscriptions paid to agents and it is best to remit direct to the Publisher.

Issued on the 1st day of each month.

ROCKS and MINERALS PEEKSKILL, N. Y., U. S. A.

The Official Journal of the Rocks and Minerals Association

Chips from the Quarry

WHY THE "DEVIL"

In the perusal of geologic literature, we are amazed at times by the frequent uses of the words devil and satan. It is Devil's Den, Devil's Cave, Devil's Playground, Devil's Punchbowl, Satan's Kingdom, Satan's Ravine, or else it is Hell's Acre, Hell's Kitchen, Hell Hollow, but never Saint's Rest or Saint's Retreat.

We have been most tolerant with this practice and especially so when some weird, uncanny, fantastic or abnormal rock formations were being described. But the practice has been and is so common in labeling any unusual rock formation with the appellation "Devil" or "Satan" or "Hell", that it is about time some one protested against it. Whether we realize it or not, every time we use the words "Devil, Satan or Hell" we are perpetuating the name of the Evil One. Why should we do this? Why should geology or mineralogy, two very fascinating and intensely interesting subjects be affiliated with the Evil One? We naturally connect the devil with ugly things, cruelty, murder, torture and other fiendish deeds, but where in the name of God does geology or mineralogy fit in?

What made our blood boil recently was the sight of a picture—of a beautiful little girl, perhaps four or five years of age, bathing in a depression in a cave formation. The picture was captioned "The Devil's Bath Tub".

Can any sane person tell us why this beautiful little girl, this little saint, should be linked with the Evil One? What crime had she committed?

Why is the devil commemorated so often? He never made any of the rock formations, not even those which are weird and queer. It is God who made them but is the Creator ever given credit? Have you ever heard of God's Cave, God's Den, God's Playground? There may be some somewhere but we have not heard of even one.

The devil seems to be a most popular deity. If his name is not on the lips of man than some rock or mineral is tagged with it. No wonder there is so much wickedness in the world. If God could only be thought of as much and the Evil One pushed back in his place, then the world might be a better place to live in.

Peter Zodac

Mineral Identification Simplified, a handbook for identification of all known minerals up to 1940, classified according to specific gravity and hardness, is due to be released about June 20th.

The author of this new book, which is destined to be very popular with mineral collectors, is Orsino C. Smith, A.B., A.M., President of the Los Angeles Mineralogical Society.

The book will have a flexible leather binding, be 5x7½ inches in size, will contain about 250 pages and will sell for $3.50 a copy. Advance copies may be ordered from the author, Mr. Orsino C. Smith, 5157 Santa Ana St., Bell, Calif.

Mr. Smith, a member of the Rocks and Minerals Association, recently called at the offices of ROCKS AND MINERALS while on a long trip to the east coast.

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Vol. 15, No. 6

The Official Journal of the ROCKS and MINERALS ASSOCIATION

Whole No. 107

SOME NOTES ON ST. LAWRENCE CO., NEW YORK

(Sketches by the author.)

By LEO NEAL YEDLIN

Cedar Grove, Maine.

For many years I had enjoyed the possession of a suite of minerals from St. Lawrence Co., New York, and when an opportunity was afforded to visit this region I jumped at it. The New York State Geological Association had planned a trip to study some of the geologic features of the area, and this, I thought, would enable me to collect the minerals found there. The prospectus listed such famous localities as Gouverneur, Edwards and Fowler. Pierrepont, site of famous tourmalines, was not included, but I assumed that casual inquiry locally would disclose the place. I anticipated no trouble finding it.

And so we set out, one Wednesday afternoon in May, 1939, three members of the New York Mineralogical Club, Inc.: Dr. F. D. Zeman, navigator, Dr. F. H. Pough, of the American Museum, interpreter, and I, rather competent ballast. At Albany, Miss Winifred Goldring, State Paleontologist, came aboard, and the four of us traveled northward and westward, pausing at Schuylerville, to see New York's only volcano and subsequently stopping at North Creek to collect specimens of the world's largest garnets.

The quarry is atop Gore Mountain (a certified ski run in season) and the garnets occur in large nodules and rough crystals. Masses two or more feet in diameter are not uncommon. A peculiar feature of the deposit is the fact that every garnet mass is surrounded by a band or zone of black hornblende, ranging from one-quarter inch to six inches in thickness. This makes for fine photography, for each garnet stands out from the native rock. The material is quarried by open pit methods, crushed, and separated by flotation. It is finally graded and bagged for shipment.

The producers of this mineral state that the garnet runs about a half point harder that the usual almandite; thus the great demand for it as an abrasive. The material has the property of fracturing with unusually sharp edges. The granules do not become round and smooth with use but constantly offer new sharp surfaces. Since it is a characteristic of minerals that their sharp edges are harder than their flat surfaces this may be the reason for the allegation as to hardness. However, this is surmise on my part.

We departed from the North Creek mine with a number of specimens and the recollection of a most interesting and unusual experience. Visitors to this locality should see Mr. Frank C. Hooper, superintendant of the plant. He is a most gracious host.

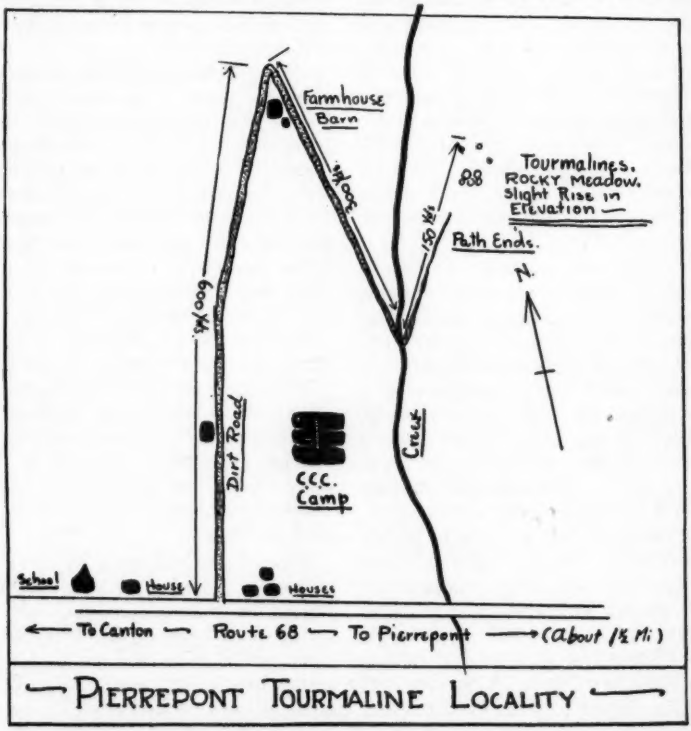
From Gore Mountain we sped northwestward, stopping only to permit Dr. Pough to photograph (in color) the spring flora—dutchman's breeches, bellwort, white, pink and painted trillium, spring beauty, etc., using my rather adequate shadow as background. Finally to Pierrepont.

Now for tourmaline! Inquiry from the local filling station attendant as to the location elicited, "Never heard of the place." From the general store, "No such place around here. Speak to Charlie. (indicating a loiterer) He's been here for 26 years . . . ." From Charlie, "Black tourmaline . . m m m . . You don't mean black quartz, maybe?"

Well, this was close enough for a native and after receiving detailed directions, and after much b u m p i n g and sloughing thru old wagon roads never meant for a new low slung car, we found the farmhouse and the farmer. He took us thru fields and thickets and barbed wire (why won't ordinary wire do to separate fields from the road?) and to his ledge of black quartz. No, it wasn't the place, and the so called quartz was a vein of pyroxene in granite. But the trip was not in vain. We found a considerable growth of walking fern (Camptosorus), the only place other than Natural Bridge, Virginia, that I had seen it. So far we were botanists. Geology had better catch up with us.

Temporarily withdrawing f r o m the field of exploration, and h o p i n g that someone at the college would be familiar with the locality, we continued to Canton, the base of operations of the New York State Geological Association.*

*No attempt is being made to describe all the localities visited. The itinerary, published by St. Lawrence University at Canton, N. Y., host of the society, describes the geology of the region covered. Numerous published reports fully describe the famous Gouverneur, Fowler, Talcville and Edwards localities, enumerating minerals found. I am merely discussing four of the many places visited, not commonly known, or which the casual collector will not find without a good deal of difficulty. The workings at Gouverneur, Fowler, Talcville and Edwards may be seen and immediately recognized from the road. Those here discussed may not. L. N. Y.



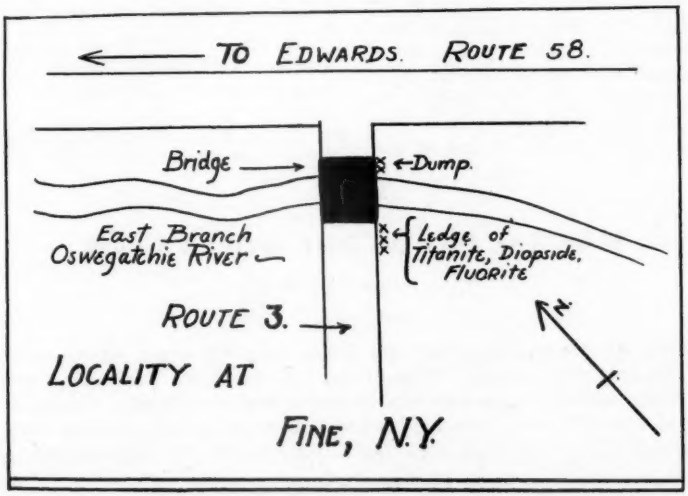
Subsequently we were guided to the locality. The sketch will assist in finding the place. And it was well worth the trouble taken, for after crossing the brook and entering the meadow, rather large masses of quartz and granite were noted. Thruout these "boulders" the tourmaline crystals were profusely scattered, some in contact with a rather earthy, iron saturated calcite. Here and there were evidences of former workings, pits not more than two or three feet in depth. By digging with a pointed stick numerous loose single crystals were turned up. An hour's mining provided dozens of specimens. .

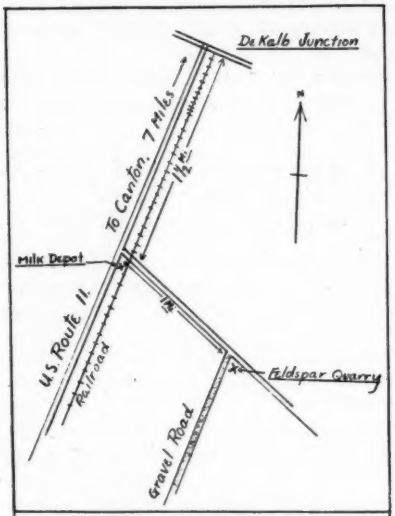
These tourmalines are unusual in form. Some have very short prisms and rather perfect rhombohedral terminations, making the crystals appear somewhat like black garnets. Others have minute prisms or none at all, so that the crystals are flattened. All are lustrous and make magnificent specimens.

One of the minerals we particularly wanted was danburite, at one time rather plentiful at Russell, N. Y. Not unlike topaz in form, it occurs in yellowish or whitish yellow crystals, somewhat harder than quartz, with a greasy or vitreous lustre. No one seemed to know the exact locality. The only available information was that the mineral had not been reported for a good many years. We surrendered to rumor and abandoned our quest.

A place of interest was Fine, N. Y. (See sketch.) Good titanite and diopside had been reported. Proceed southeasterly, along route 58, from Edwards until the road forks, (about 10 miles from Edwards). The right fork (route 3) crosses the Oswegatchie River. Immediately over the bridge a bare face of rock is encountered at the left. Excellent crystals of titanite, with rough green diopside crystals, in a grey feldspar are readily encountered. Granules of purple fluorite add color to the mass. It is not necessary to "mine" the wall. Recross the bridge. On the same side, but near the water's edge are large loose masses of the same rock, deposited as fill when the roadcut was blasted.

About two and a half miles from DeKalb Junction is an abandoned feldspar quarry. Investigation showed extensive dumps and a fine white fieldspar, albite. Apparantly the present demand is for the potash feldspars, microcline and orthoclase, and thus the cessation of operations





DEKALB JUNCTION FELDSPAR QUARRY

here. The most southerly dumps provide the best pickings. Here feldspar and quartz are intermingled, and the following minerals easily collected: Titanite crystals up to one inch in size; sharp green, translucent monoclinic crystals of tremolite, one of which, broken from a mass of quartz, measured approximately 1¼ x 2½ inches! This is now in the State Museum at Albany, N. Y.); small ⅛" cubes of uraninite, some altered to thucolite; several specimens of a greyish mineral, one of which Dr. Pough carried away for identification. Here is an ideal locality. None of your hunting thru fields and farmsteads to track down an elusive rumor. Start at the top of a rock pile and work your way down. You need not move a foot horizontally, for after several hours of digging you will have moved about 10 feet vertically! And the contents of the hole will be in your bag!

I could go on indefinitely, both collecting in St. Lawrence County and writing about it. Let it suffice that we obtained talc; "hexagonite", the latter a surface of small, perfect, transparant, terminated, lilac crystals; tremolite, at Fowler. At Gouverneur we collected small brown tourmalines. From Edwards we carried away specimens of sphalerite, pyrite, red willemite, ilvaite crystals in chlorite, anhydrite, galena and hematite. All these in addition to the minerals listed in the article.

And so homeward thru the beautiful Adirondacks, passing Tupper and Long Lakes, lunching at Placid, visiting Whiteface Mountain the first day it was open in 1939 (and finding allanite) and back to Albany. A visit to the State Museum was in order, for we must needs compare our specimens with those collected in St. Lawrence County years ago. (And I, for one, didn't do so badly by comparison.) Home, then, to New York City and the memory of a magnificent trip.

Oh yes. That grey unidentified mineral from DeKalb was determined finally. You guessed it—DANBURITE!

Editor's Note: Mr. Yedlin formerly resided in New York City; he moved to Maine about seven months ago.

MINERAL DAY AT THE WORLD'S FAIR

(New York City)

Mon., June 17, 1940

Many of the members of the Rocks and Minerals Association have written us that they expect to be at the Fair on June 17th when minerals will be emphasized in the exhibits of states and countries. You may meet many old friends there, besides having the privilege of viewing some very fine exhibitions of mineral specimens, jewels and precious stones.

See page 189 for official instructions.

AMETHYST OF THUNDER BAY

By J. F. CORBETT, M. D.

Years ago when Port Arthur, Ont., Canada, was ordinarily reached by boat from the United States, the approach to Thunder Bay was filled with romance and speculation. As the ship picked its way into the bay, Pie Island at about the center of the portal, was skirted. To the east, Silver Islet stuck up from the lake as though no larger than a church. Silver Islet is rather difficult to get to, but fishermen sometimes to this day dredge up native silver in pieces of such size that they weigh up to two pounds. For a brief description of Silver Islet and the mine once operated there I will quote National Geographical Magazine LXII—August, 1932—P. 160. "In Ontario mining history it is a curious fact that the first important silver find was made on an islet only 80 feet across, situated in Lake Superior off Thunder Cape. In this tiny speck of rock a hole 1250 feet deep was dug from which $3,500,000 in silver was taken." The elevation of Silver Islet is given as 18 feet above Lake Superior, by Survey of U. S. War Department. The mine on Silver Islet is flooded so any examination of its contents is impossible. No material could be located for study.

The following list is taken from *The System of Minerology* of James Dwight Dana, sixth edition—1915, p. 1101.

Silver Islet:—Argentite—native silver—niccolite—chalcocite—malachite. silver arsenide—pyrite—calcite. galena.

Thunder Bay District and Westward.

Amethyst Harbor:—Amethyst!

Dog Lake:—Native lead.

Duncan Mine:—Dog tooth spar—argentite.

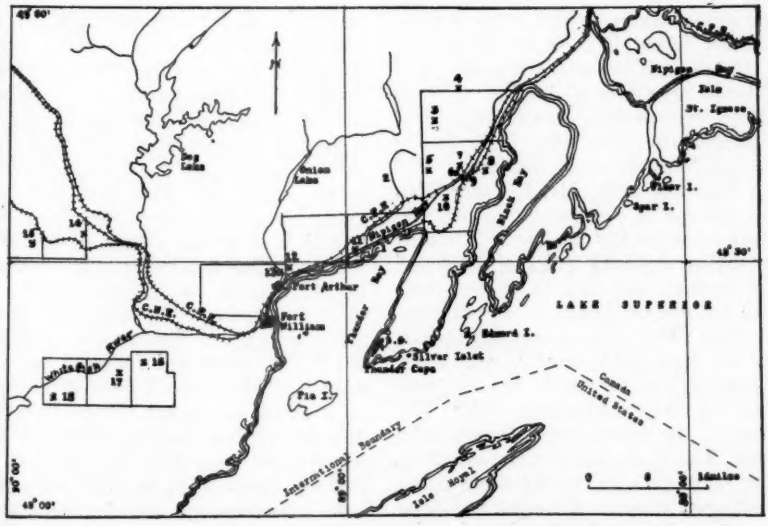
McIntyre:—Siderite.

Neebing Lake:—Barite.

O'Connor:—Beaver mine—Asbestus.

Thunder Cape:—Galena

Thunder Cape stands forth with great boldness guarding the right approach to



Map of the area around Thunder Bay, Ontario, Canada.
1—Amethyst Harbor 2—McKenzie River S.G.—Sleeping Giant (an enormous basalt sill)
Nos. 3-18 are localities which may be described in later issues of ROCKS AND MINERALS.
Topography is from Canada Survey. Map 308A—Nipigon Sheet.

Thunder Bay. Thunder Bay itself is almost rectangular in shape. It is bordered on the east and partly on the west with small mountains 1200 feet above mean Lake Superior level (on the east) and 990 feet (on the west); the surface of Lake Superior is 602 feet above sea level. To the north the rocks are less lofty and the country seems almost flat. The bay is about seventeen miles across. On the east the Sleeping Giant on Thunder Cape, an enormous basalt sill, guards the treasures of amethyst and of silver in Thunder Bay. Port Arthur is on the northwest corner of the bay.

I have found no amethyst nearer than twelve miles east of Port Arthur and on the McKenzie River. The dykes containing the amethyst run in a northeasterly direction mainly from Amethyst Harbor, which is part of Thunder Bay, Ontario. These are in diorite. Most of the rocks constituting the lofty peaks are basalt sills. The embedded slate has been more or less eroded.

The region of Thunder Bay, Lake Superior, has been famous for amethyst ever since the time that railroad building and attempt at mining opened up deposits of those beautiful crystals. Every yard in Duluth and Port Arthur boasted of at least one large mass of amethyt. As time elapsed these amethysts all disappeared or became so unattracive from fading that they were no longer desired.

A friend of mine, Mr. Clarance Watson, told me of a mine dump that contained more or less amethyst. I visited the region, fourteen miles northeast of Port Arthur, and together we investigated the pile of debris, on an old prospect mine dump. The dump was at least fifty feet high and covered an area about six-hundred feet across. In it were loose pieces of amethyst-bearing rock. The source of the material was from nearby dykes. The Canadian records are silent as to what valuable metals these dykes were hoped to bear. The work was done by miners before 1850. Agassiz, describes these efforts but does not say that they found any thing of value. See—*Lake Superior, Its Physical Character, Vegetation and Animals* by Louis Agassiz and J. E. Cabot.

In going over the material in the dump it was hoped that we could find some fragment of rock that would indicate why these early miners expended so much work. The dykes were four or six feet across and had been mined to an indeterminate depth. Water filled the excavation to within ten feet of the surface. The material in the dump was clay, previously removed in uncovering the dyke, and masses of quartz from the dyke. The quartz was white or amethyst in character and did not in any place show any pyrite or decomposed pyrite that usually predicates gold. No other mineral was found.

By patient work, together, we recovered sixty pounds of desirable groups and single crystals of amethyst. These had to be excavated very carefully and cleaned with infinite care. When so treated the material came out fairly well. There were many doubly terminated crystals and one in which the prism was over an inch long mounted by a perfect pyramid. Most of the specimens had very short six-sided prisms or none at all, only pyramids.

Nearby was the place from which the material had been taken. It was a dyke or wall of diabase that had formed in a cleft in the granite-like rock that I believe is diorite, as the feldspar seemed to be plagioclase. This dyke had been shattered by some movement of the strata and later on the advent of hot solution had filled the cracks with amethyst. In some places the diabase was cracked and cemented with quartz, in other places successive deposits of amethyst and white quartz had followed one another until there was a layer of deposited material six inches thick. The crystals occurred in perfect form on the surfaces and were deep purple in color grading down to some that were yellow. Unfortunately, almost always, reddish flakes of iron occur close to the surface of the crystal. This often gives a reddish tinge to the groups. I have one specimen a foot square where this

staining has not occurred but it is about the only one I ever saw. None of the material is suitable for cutting, however, but they do make beautiful cabinet specimens.

The last visit I made to the locality was in August of 1937, together with Dr. L. O. Dart. We found Mr. Watson had worked the hill so thoroughly that we could uncover very little of the amethyst ourselves. He had, however, carefully collected many pieces and hid them, writing me where they were cached near a cedar tree. It was fortunate for us that only a few cedar trees were present, because during the wet season the amythyst had buried itself and had to be dug out of the muck, otherwise we would still be looking for them. Few of the crystals measured two inches in diameter. One presented many successive layers on cross section.

The amethyst dyke seems to extend a long ways from Crystal Bay to Pearl Harbour. We found one pit, containing amethyst, that was two and one-half miles away from the prospect. I have specimens of amethyst from Pearl Harbour, a locality that is almost ten miles further away in an easterly direction. Originally, pieces of amethyst were found on the beach but none have been reported for a long time. We could trace seams in the rock containing amethyst for several miles. These took various directions but the main dyke followed a course from Crystal Bay to Pearl Harbour skirting the coast approaching the lake and again appearing on the coast.

Some description of the country is probably in order. The Nipegon Highway courses not far from Lake Superior. The country is well described as brush. Most of the growth was a stunted growth of birch and spruce and a few scattered cedars. A dense tangled growth of black alder and stunted poplar occurs. Dwarfed mountain ash appears. Trees on the dump were found to be about seventy years old but these trees would not indicate by the size much more than one-third of their age as compared to trees in Minnesota. The soil was clay mixed with iron. Enormous flat outcrops of rock occurred that permitted one to trace the dykes containing basalt and amethyst. One of these rock tables covered with weathered phenocrysts of feldspar gave an excellent table for our car. These flat tables extended for acres and probably miles. The outcrops of rock with the dykes were possibly not more than 250 feet above the lake. The basalt in the distance towered higher when viewed across the bay. The water flowing in scattered courses was deeply stained with iron and this was true of springs that fed the streams.

MINERAL DAY AT THE WORLD'S FAIR

(New York City)

Monday, June 17, 1940

Official Instructions

Activities will begin at 10:00 a. m.

At every entrance gate to the Fair a man will be stationed who will give to each visiting mineralogist a copy of the official program for the "Mineral Day" and a questionnaire which is to be filled out and deposited in the ballot box present—a stub is to be retained by the visitor. The questionnaire will entitle the visitor to compete for prizes which are to be given out—fifteen $5.00 mineral specimens.

Notice—In filling out questionnaires be sure to state you are a member of the Rocks and Minerals Association if this should be the case.

SOME INTERESTING PROPERTIES OF HYDRATED MINERALS

By Mary S. Shaub

Northampton, Massachusetts

If one were to pulverize a cubic yard of the common mineral, Limonite, $2Fe_2O_3.3H_2O$, the result would be a pile of dust, proverbially as "dry as dust." But if one were to place this in a suitable retort, heat it to a sufficiently high temperature and condense the water vapor given off, the condensate would fill 2½ barrels. (42 gallons per barrel). This may seem almost unbelievable to the average mineral collector, yet chemical analysis of the mineral shows that it contains this extraordinary amount of water.

The water content of hydrated minerals is regarded as occurring wthin the mineral structure in at least two different ways. The first and probably the most common of these is what is known as water of crystallization. In this type of hydrated mineral the water is released readily when heated to a fairly low temperature as in the minerals Gypsum, $CaSO_4.2H_2O$, Autunite, $Ca(UO_2)_2P_2O_8.8H_2O$, and Chrysocolla, $CuSiO_3.2H_2O$. In the other type the water occurs as an (OH) or hydroxyl group and the mineral is in reality a basic salt. Upon the application of heat this type of hydrated mineral releases two atoms of hydrogen and one of oxygen from two hydroxyl groups thus yielding a molecule of water. This latter type is represented by such minerals as Brucite, $Mg(OH)_2$ and Malachite, $CuCO_3Cu(OH)_2$.

If one examines a list of minerals such as that of Larsen and Berman[1], one would no doubt be surprised at the number of minerals that contain water, for more than half of the total number contain at least some water. To be more specific, 734 out of the 1238 that are listed are hydrous. Of the many hydrated mineral species, sixty were selected and the amount of water they normally contain was computed from the given composition. The selection was made to include as great a range of water composition as possible without testing the percentage composition of each mineral to determine the volume of water per unit volume of mineral as, for instance, a cubic yard.

The surprising result of these calculations was that in this somewhat random selection there were found to be minerals containing up to 191 gallons of water per cubic yard of the mineral. To the average collector as well as the beginning student of mineralogy it is indeed a surprise to learn how much water could by proper procedure be obtained from some of the minerals of his cabinet. A list of minerals showing a wide variation in water content is given in Table I.

It is interesting to note that the actual number of gallons of water per cubic yard as shown in the table is not proportional to the percentage of water that the mineral contains but it involves the specific gravity of the substance as well. For example, the common mineral, Stilbite, contains 15.00% water or 67 gallons per cubic yard while Limonite which contains about an equal percentage of water, i.e. 14.50%, contains 111 gallons of water or nearly twice as much. The specific gravity of the former is 2.2 while that of the latter is 3.8 The greatest surprise is in comparing the amount of water contained in a cubic yard of ice which is a mineral made up of 100% water with the mineral Brucite. In the former the water is 185 gallons per cubic yard while the latter contains 189 gallons or four gallons more. The question is how can a cubic yard of a mineral contain more water than an equal volume of ice, and in addition some 2460 pounds of magnesium oxide? The

[1]Larsen, Esper S. and Berman, Harry, **The Microscopic Determination of the Nonopaque Minerals**, U. S. G. S. Bull. 848, 1934.

Table I

Mineral	Composition	% Water	Specific Gravity	Gallons of Water Per Cubic Yard
Muscovite	$KAl_3(OH)_2(AlSi_3O_{10})$	4.54	2.8	26
Thomsonite	$(Ca,Na_2)Al_2Si_2O_8.2\frac{1}{2}H_2O$	13.40	2.36	64
Stilbite	$(Na_2,Ca)Al_2Si_6O_{16}.6H_2O$	15.00	2.2	67
Gypsum	$CaSO_4.2H_2O$	20.91	2.32	98
Diaspore	$Al_2O_3.H_2O$	15.05	3.33	101
Limonite	$2Fe_2O_3.3H_2O$	14.50	3.8	111
Turquoise	$CuO.3Al_2O_3.2P_2O_5.9H_2O$	19.48	2.84	112
Vivianite	$Fe_3P_2O_8.8H_2O$	28.71	2.6	151
Alum	$KAl(SO_4)_2.12H_2O$	43.17	1.76	153
Borax	$Na_2B_4O_7.10H_2O$	43.30	1.70	163
Brucite	$Mg(OH)_2$	39.00	2.39	189
Felsoebanyite	$2Al_2O_3.SO_3.10H_2O$	44.60	2.33	191
Ice	H_2O	100.00	0.917	185
Water	H_2O	100.00	1.00	202

answer is that the atoms of the magnesium, oxygen and hydrogen are much more closely packed in Brucite than are the hydrogen and oxygen atoms in ice. This is also indicated by the differences in specific gravity. It may be noted here that a cubic yard of the mineral water contains 202 gallons.

There are some other interesting facts about the hydrated minerals. They are on the average somewhat lighter or have lower specific gravities than those not hydrated; they have in general a lower hardness and a considerable number are soluble in water while a large number are soluble in acids. In mode of origin they may be divided roughly into three major groups: those formed in salt lakes, those originating in veins and the alteration products of other minerals. In each case during the time of formation there was abundant water present.

There are many unusual experiments the average collector may perform with hydrated minerals providing he has the facilities for using a blowpipe. The results of an experiment easy to perform are shown in Figs 2 and 4. This experiment consists of heating pieces of Stilbite and Vermiculite.

First a piece of Stilbite was heated causing it to expand many times as shown by comparing Figs. 1 and 2. At the beginning of the application of heat the mineral expands by sending out peculiar tentacle-like projections which are undoubtedly due to the action of steam resulting from the liberated water. If the

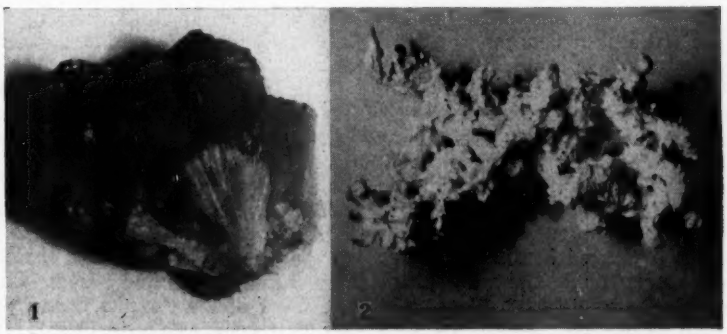


Fig. 1. Stilbite before heating. X=3
Fig. 2. Same as Fig. 1 after heating with the blowpipe. Natural size.

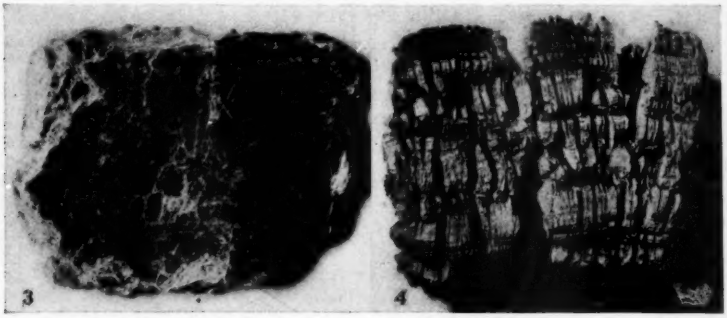


Fig. 3. Vermiculite before heating. X=1.8.
Fig. 4. Same as Fig. 3 after heating with the blowpipe. Thickness of specimen increased from ¼" to 1⅝". The section parallel to the cleavage remained the same.

temperature is high enough the mineral then melts to form a white enamel-like substance. Because of this frothing characteristic Stilbite, as well as other minerals of the group have been called Zeolites, which term is derived from the Greek for "boiling stone" in allusion to the manner in which they act when strongly heated. Despite this expansive property Stilbite has no present commercial value.

Vermiculite is another mineral which produces spectacular expansive properties when heated with the blowpipe. The results of heating this chloritic mineral are shown in Fig. 4. The remarkable exfoliation is believed to be due to the formation of steam between the layers which forces the mineral plates apart along the planes of eminent cleavage. Vermiculite was regarded as a mineralogical curiosity until about ten years ago when it was looked upon as a material likely to become of considerable industrial importance for its properties of both sound and heat insulation. It is obvious from the illustration, Fig. 4, why Vermiculite forms such an excellent insulating medium as it is very light in weight and is easily transported. It is a comparatively rare mineral known only from a few scattered localities. A large deposit occurs near Libby, Montana. Other deposits are reported to occur in Wyoming, Colorado, North Carolina and Georgia.

Several of the hydrated minerals have properties, as a result of their water content, which enable them to be used commercially. One of the commonest of these is Gypsum, $CaSO_4.2H_2O$, which occurs in extensively bedded deposits in a great many places in the United States and throughout the rest of the world. For certain uses as for plaster of Paris, plaster board, wall board, insulating board, dental and surgical plasters and many others, the Gypsum must first be calcined. That is, a *part* or 1½ molecules of the water are removed by heat. If the entire amount of water is driven off the material becomes inactive and loses its ability to harden readily on the application of water. Such plaster is said to be "dead burned." It will be apparent that in this material, so widely used in building, the ease with which it releases and takes up water of crystallization is the all important property which makes Gypsum a valuable non-metallic mineral.

The making of brick from clay involves the use of hydrated minerals. These are chiefly silicates of aluminum, iron, magnesium and calcium which contain a varying content of water and which possess the required physical properties, when wet, which enable the clays to be moulded or formed by other means into the desired shapes. During the firing of the clay the water held in chemical combination is liberated as a volatile product and the residual parts of the minerals recombine readily during

dehydration into new substances or become fused and act as a bond for the coarser material.

In many other minerals there are important changes in form or color which may or may not have some commercial importance. Turquoise on exposure to dry air slowly becomes greener thus becoming of less value as the blue colored material is far more desirable. This is the result of a loss of some of its water of crystallization. Limonite may become dehydrated and produce Hematite. This phenomenon is common in desert areas where Limonite, which is originally produced in the decomposition of iron-bearing minerals, after a long period of exposure, changes to Hematite, Fe_2O_3.

From Virgin Valley, Humboldt County, Nevada comes an opal which "when first mined is translucent and richly emerald green in color but in the dry air of the semi-arid region it loses much of its moisture in a very short time and becomes a semi-translucent yellowish green."[2] Opal, however, is not a crystalline mineral and does not contain a definite amount of water as in the crystallized species. Neverthless, the presence of water within the material—up to 10 per cent—is an important constituent. Thus this property of diminishing color with dehydration would detract from the value of these opals. This mineral also becomes less fluorescent with time, a unique property among fluorescent minerals. The loss of water apparently has some relation to this change in intensity of fluorescence.

Many rocks and minerals do not expand gently or intumesce, that is, swell up, to allow the escape of steam as do Stilbite and Vermiculite but they sometimes disintegrate with explosive violence. This is a very common experience for campers who build their camp fires among the rocks or use rocks or stones for a fire place. An instance of this nature was mentioned in the December, 1939 number of ROCKS AND MINERALS. Minerals which disintegrate with more or less violence are said to "decrepitate."

Acknowledgement

The writer wishes to express her thanks to the Schortmann brothers for supplying the Stilbite specimen illustrated in Fig. 1.

[2]Ward's Natural Science Establishment. Bull. December, 1939, Vol. VIII, No. 4, Rochester, N. Y.

NEW CAVERNS DISCOVERED IN VIRGINIA

On March 20, 1940, after months of examination of the terrain, new caverns were discovered under the lands of Brig. Gen. S. Gardner Waller near Front Royal, Va., states an announcement in the April 2nd issue of *Northern Virginia Daily* of Strasburg. The discovery was made by Walter S. Amos of Winchester, Va., who was convinced, after several months prospecting, that they were present. The entrance to the Caverns is about ½ mile southwest of the Front Royal entrance to the Shenendoah National Park.

Although the Caverns have not as yet been explored thoroughly, they are quite extensive and contain such a wide variety of interesting stalactites, stalagmites, drip stones, flow stones and other cave formation that they have been mapped and will be put into shape for their opening to the public on June 1st, 1940. They will be operated by Front Royal Caverns, Inc., who already possess and operate the famous Skyline Caverns near Front Royal. Mr. Amos, who is Vice-President of the Company, is a member of the Rocks and Minerals Association.

Our congratulations are extended to Mr. Amos on his new discovery. May he make many more of them.

"OLD KING COAL"

By ERIC L. ARMSTRONG

Cert. Mine Manager

When, where, and how man first produced fire is now lost in the mist of ages. It may be that his first acquaintance with the cheery influence of fire came from one that was started from a lightning flash or from spontaneous combustion of piled vegetable matter, as hay, leaves, or other material he had used for bedding.

It could be that his first fire came from a volcanic source. He would discover it possible to carry fire with him, as is done even today by natives of primitive regions, in the form of "fire-sticks", which are jealously guarded.

His first fuel, doubtless, would be wood, the fallen branches of trees, and such as could be readily broken up. In using the fire to cook his food, he would observe that fats from meats would burn; and where fats could be obtained in quantity, as with the Eskimos, and other northern peoples, fat would become a fuel as oft as a food.

With the congregation of people in villages, towns, and cities, wood would be used in such quantities as to become scarce in the vicinity. This may be the reason for the abandoned townsites found in many places. The people migrated to places where fuel could be secured.

When, and where "coal" was first used is another mystery of the past. It is known that in Siberia, a coal seam has been burning along it's outcrop for centuries. The first account of coal being used is from Chinese history. Did an observant Chinaman note that the coal burning in the ground could be taken from it's bed and used in the home? Did he make a fire—as many do—by forming a pen of stones to confine it, and that the stone he used happened to be lumps of coal? Whatever the form in which the discovery took place, an observant man would take advantage of his discovery of a new fuel source.

My own first discovery of an ancient mine was while employed in the great coalfield of South Wales. The roadway I was driving broke into old workings, of which no records were available. A survey of them enabled us to ascertain the place of entry from the surface. On our examination of the surface, we found a depression in the ground where the entry had been, and a pine tree, upwards of a hundred feet high, growing in the hollow.

Collaborating with a local historian in the search of local history, we found, in the papers of an old family, records of these early workings. I quote from what we found in these papers:

"Ioan Jenkins reports that wood for the making of coal is scarce, and he can no longer continue to supply coal, (charcoal is here meant). He has discovered a "stone-coal" which makes an even hotter fire than the wood coal; especially if the fire be made on bars above the ground. He craves permission to dig, and to supply this "stone-coal" in lieu of the wood coal".

The records went on to describe the place from which the "stone-coal" was obtained, and that it proved very satisfactory in use. This established the fact that it was from this ancient mine we had broken into that coal had been mined shortly after the Roman era in Great Britain.

Since that time I have learned that what was known as "sea-coal" had been used in north Britain for ages. This coal came from the outcrops of seams under the sea, and washed ashore by the waves. How it became known it would burn is another mystery. When coal was mined extensively in north Britain, and carried to London by boats, the term "sea-coal" stuck to it. I may mention that many think the name came from the coal being sea borne, and not from the earlier definition given.

How is coal found in the earth? The practical answer is: "With the pick and shovel of the miner." This is not however a complete answer.

Those gifted with the power to observe will have noticed that the rocks forming the outer crust of the earth are mostly bedded; stratified is the correct term.

Different layers of the earth are found to have different characteristics. Some are hard, some are soft, some contain the fossilised remains of plants and animals, some are barren of fossils. The beds have been divided into orders, or formations by geologists, and coal is mostly found in the formation known as the "Carboniferous". It is occasionaly found in other formations, but they are not so richly endowed as is the Carboniferous.

Observe a barren hillside, and note there are layers of different rocks in it. Observe they are of different thicknesses and colour. Coal is found in beds, called "seams", in like manner. The miner tunnels into a seam, and digs the coal for our use. It is a calling that demands considerable skill, for the miner has to cope with the matter of ventilating his mine, supporting the roof and sides, and a thousand and one other problems the layman may never dream of. If "YOU" happen to stumble on the outcrop of a seam, do not make the mistake of thinking you have nothing to do but dig out a few million tons for sale, and so make a quick fortune. You may succeed in getting a considerable tonnage, then getting buried,—without having to request the services of a mortician.

What are the indcations a layman should look for, in order to locate a seam of coal?

Are there any mines within short range of the place you wish to prospect? Do the seams in these mines lay flat, or do they dip in any direction? Which way do they dip, and how much? This is "my" first query.

Examine small streams and see if you can find fragments of coal in the beds among the gravel. If you do, it is evident the stream flows aross the outcrop of a seam, and carries away fragments eroded from the seam.

Examine any gravel pits around. You may find pieces of coal in the gravel, and if they are "angular" it is an indication they did not travel far. If they are rounded, they have become so by the action of water rolling them, in which case they may have come from a distance.

Is there a "dark swath" on a freshly ploughed field? Examine it for traces of coal. Possibly this dark swath is "coal-blossom", finely divided particles of coal in the soil; and indicative of a seam beneath.

You may locate a seam on a steep hillside. This is an easy place to commence a mine. But — secure the services of a practical miner to develop it. It is very easy to get buried. Even the miner with years of experience sometimes gets caught.

There are three forms of mines. Where a seam can be entered from a hillside, and is lying flat, it is gnerally termed a "level", or "adit mine."

Where it outcrops at the surface, but lays at an angle from the horizontal; it is usually entered with a sloping tunnel; and is termed a "slope mine."

When the seam is deep, but known to exist beneath the surface, a vertical shaft is sunk to it. In this case, it is termed a "shaft mine".

There are instances of coal seams being so near the surface, the overlying cover can be removed, and the coal dug without going below the ground. This is generally termed "open cast mining".

Should any of you find what you consider a seam of coal, and wish to develop it into a mine, there are several things you must consider before commencing to do so.

Is the deposit likely to warrant a large sum being spent on development? Can it be developed at small cost? Does the coal belong to the land owner, or to the State? Can you secure a lease to mine this coal? Is there a market in sight for quantities? What about a "right of way" to and from your mine?

So you think you have a seam of coal, a market for it, can secure a lease on a large area, and become an employer of men? Very good. Further on I will entertain you with a description of how a mine is developed from the grass roots down, and under the surface radially for miles to win the coal for our fires.

A GEOLOGICAL PARK IN WORCESTER, MASS.

By HARRY C. PARKER

A permanent outdoor exhibit of local geology opened recently in Worcester, Mass., is attracting considerable attention and may represent a method of popularizing the study of rocks and minerals in other localities.

The Worcester Natural History Society, finding itself in possession of a piece of vacant land near the center of the city, sought to utilize it for some constructive purpose. Two factors were dominant in deciding what type of exhibit should be made: (1) minimum outlay of cash and (2) minimum of attention after construction. Rocks being indestructable (?) and of general distribution, it seemed that an outdoor display of local geology would fill the bill.

It was decided to display labeled specimens of the main kinds of rock which underlie the city of Worcester, in progressive order; along one side of the trail in chronological order, while the other side was reserved for specimens showing unusual structural, mineralogical or commercial features.

While prospecting for the main specimens was going on, the custodian of the Natural History Museum laid out a gently meandering path, two and one-half feet wide and 220 feet long. The grade of the lot changes from one to 20 feet, making a great set-up for chronology, starting with the oldest rocks at the bottom, and placing progressively younger ones as one ascends the trail and the geologic column. At 20 foot intervals along one side of the trail, the turf was removed from a square about three feet on a side. These were the locations for the specimens. By staggering the squares on the two sides of the path, the specimens will be but ten feet apart, on alternating sides, when the exhibit is complete.

Fortunately, the geology of the region had been written up, but the director of the Museum, upon whom devolved the task of prospecting, was just an amateur, and had a difficult time locating desirable specimens for the purpose at hand. To be suitable, the specimens had to be of a large size, at least three feet by a foot and a half on one face, and loose, so that no quarrying expense would be entailed. Furthermore, each piece had to be as nearly typical of its kind as one specimen can be for a whole bed. U. S. G. S. Bulletin No. 597 on the geology of Massachusetts and Rhode Island by Emerson contains an areal map, but it is difficult for one who is not a petrographer to recognize some of the "varietal" forms. Perry's *Geology of Worcester, Massachusetts* was helpful also, although some of the names given there are not used now.

After consulting the city engineer's office for current blasting operations and old quarries, and Dr. Homer P. Little of Clark University, among others; enlisting the aid of my good wife, who is a geologist; and making many excursions on foot in mid-summer heat, suitable pieces of the eight main kinds of rock required were located, together with three others of special interest. Particular mention should be made of John Broderick, the Clinton, Mass., "chiastolite man," who led me to just the right slab of Worcester phyllite containing altered specimens of the famous variety of andalusite for which he is famed.

Having located the specimens, the next thing was to track down their owners and induce them to give these specimens to us. Another problem was the hauling of them to the trail. A local monument man, who was sympathetic with our work, let us have his stone moving truck and equipment at cost per hour. Our experience with him has proven that it pays in the long run to have this done by an expert who knows his business.

We went out and picked up all the stones we could one morning, then went with the loaded truck to the monument works, where, during our lunch hour, each specimen had a four by six inch spot smoothed on it to be used for the label. Right after lunch we took the morning's haul to the trail, unloaded it, then went out for another load which was left at the works to be smoothed for delivery to the trail next morning. My recollection is that a day and a half was all that was required for this phase, although the pieces were picked up from one to twenty miles from the trail.

In putting the rocks in their proper places, a hole was dug to a depth of ten inches or a foot, the piece stood on end in it and earth filled in around the base. Our experience has shown that to be absolutely safe from vandals, we will have to use concrete. As it is now, the high school boys just can't resist upsetting them!

A commercial sign painter labelled the rocks as to name and locality, using black lettering. We covered the label space with clear Duco as Mr. Zodac suggests in his book, *How to Collect Minerals*, but strangely enough, on some specimens a reaction set in which turned the label space so dark that it was difficult to read the signs. Incidentally as you will notice in the photograph, we found it best to tip the rocks at an angle for ease in reading the labels and inspection

This is a picture of the Trail when first opened. Two more rocks have been added and the grass cut along a 6-foot swath. The posts of the sign have been painted also.
Photo by *Worcester Telegram-Gazette.*

A Worcester school class with its two teachers are being given a lecture on the Trail by the author. Photo by *Worcester Telegram-Gazette*

of the face of the specimens from the path.

To make the exhibit usable, we have prepared a two page guide leaflet which sells for five cents, or is given free to teachers and other group leaders. With the leaflet in hand, one can go over the trail, read the salient facts which it is designed to show. This was not issued until December, 1939, so has not come into wide use as yet, but with the coming of warmer weather, we are confident that many groups, like the one in the photograph, will avail themselves of this opportunity to obtain an introduction to the geology of Worcester. It will also help when we have money enough to get rid of the mud!

The trail will be augmented, we hope, by the addition of more specimens of a special nature as they come to light. At present, we have on display Bolton gneiss, Oakdale quartzite, Paxton schist, Paxton schist with intrusion of tourmaline granite, Oxford schist, Brimfield schist, Worcester phyllite, Fitchburg granite, and Ayer granite. In addition, while not Worcester rocks, there have been set up pieces of flagstone (sandstone), Longmeadow sandstone, and purple scapolite from the famous Bolton, Mass., quarry. This latter specimen, together with the phyllite containing chiastolite, are the two most likely to be especially attractive to mineralogists.

So far as we know, this exhibit is the only one of its kind in the country. The nearest thing to it is Bill Carr's "geology stone wall" near the Trailside Museum, Bear Mountain State Park in New York State which differs in that it is made like a wall and people are invited to take specimens for study. Its emphasis is on minerals rather than on rocks, and it is my impression that it is not intended to tell a connected story.

HOW TO BE A BUSINESS MAN AND A ROCK HOUND

By MRS. EDITH McLEOD
Klamath Falls, Ore.

Of course they say you can be a rock hound in your own back yard, but I mean the kind that collects every Sunday one hundred and fifty to two hundred miles away from home. It can be done and you don't have to neglect your business either (you can't afford to neglect your business if you want to be this kind of a rock hound). We do it every Sunday; and here's how.

My husband is a professional man and I am a music teacher, which means lessons until 5:00 o'clock Saturdays; so we are just starting out when other weekend collectors would be making camp some hundred miles off in the hills or desert. Perhaps we miss a little sleep, as we generally travel until 11:00, 12:00 or 1:00 o'clock in the morning. But don't you often sit up Saturday nights until eleven, twelve or one in the morning playing bridge, dancing, listening to the radio, or taking in a late show with a little lunch afterwards? So that's all right. No hardship there.

If you are an inveterate rock hound, everything is kept packed and ready just to be loaded into the car (you merely exist from Saturday to Saturday with your mind's eye on five o'clock), this includes your sleeping bags; a box containing canned foods, coffee, sugar, canned milk, soap, rags for towels (saves washing and ironing), snake bite remedy, (which we have never had to use), mosquito dope (which we use often), photographic equipment, etc., etc., and a nested set of aluminum dishes in a bucket—the bucket is required by law as well as an axe and a shovel, which are kept in the car along with flashlights, a gas lantern, nested table and chairs, gas stove and a small umbrella tent. And speaking of this set of nested dishes; would you believe that it holds a frying pan, a large kettle, a stew pan, coffee pot with lid and detachable handle, eight plates, four cups, four knives, six forks, six teaspoons, two tablespoons, salt and pepper shakers and a can opener? So we can figure on three meals without having to wash a dish. Fine! You never have time to anyway.

Another box contains collecting equipment, hammers, knapsacks, galoshes, canteens, field glasses, lots of newspapers for wrapping specimens in, egg cartons for delicate specimens, and such like.

All we have to do is to add the perishables, a bunch of large boxes and pack. We are thinking of even hanging up our clothes like the firemen use to do: shoes first on the floor, pants just above, shirt one nail higher and hat on top nail. It seems to me that with a little practice we should be able to do just as well as the firemen, and thus gain another five minutes.

And here is a typical trip. From Klamath Falls, Oregon, thru northern California into northern Nevada, and back. We always manage to get back though we sometimes wonder if and how.

Thru at 5:00 o'clock Saturday and ready to start. A caller calls. We start at 6:00 o'clock. Never forget your manners. A couple of hour's ride and a halt at the "bug checking station" in California. They are getting so that they know us pretty well by this time and after a brief inspection and a sarcastic remark on their part, we are on our way. At 8:30 we are at Alturas hunting an inconspicuous place to eat. Our togs are not the nifty outfits seen in "Vogue" magazine. They are accumulated for desert use. We eat and go on. Over the Warner Mountains Pass and we are in Cedarville by 9:45 and manage to reach the gas station before it closes. Lucky, for it is our last chance. Of course we could have put in an extra five gallon can of gas when we packed, as we often do, and would have had we known that we were going to get a late start.

And then we leave the highway and out into the desert; rougher and dark. But there is no variety of scenery any-

way, so we are not missing much. Just hill after hill, valleys and plains, dry lake beds, and a rough road that twists and turns; a continual procession of sagebrush, rabbit-brush and rocks unwinding past the car. Occasionally they leap at the car. That is when you go over a boulder. The only variety is that some hills are capped with rim-rock and some are not capped with rim-rock. And so we travel until one in the morning, when we reach our predetermined camp-spot. Want to know what we came after? Psilomelane. Pure, botryoidal psilomelane, laying all over the ground. A friend discovered the spot and is showing us to it.

It is cold. We put up the tent, unroll our beds and crawl in. It is so cold I crawl in with my clothes on, excepting shoes. Then I make the unpleasant discovery that in pinning up the ends of the tarp to keep out the ever prevailing dust I have pinned a hole thru my air mattress (hereafter it goes on the *inside* of my bed roll) so my bed is not as soft as usual. An hour later I get up and put on a caracul jacket and crawl back in. Half an hour later I get up and put a heavy winter coat on over the jacket, and coax the dog into bed with me. It doesn't take much coaxing. And still I sleep cold all night. Feet never warm up once. That's your desert night for you—however it is October, so getting colder than usual, but nights on the desert are always cold, even in July. I'll tell you later about the desert day.

We are so cold we get up at daybreak and decide to hunt specimens to warm up. So over we go and start picking up beautiful pieces of botryoidal psilomelane. It would be thrilling if one were not so cold. I huddle my two coats around me and finally sit down and take off my shoes to rub up the circulation in my feet, which are aching with cold. No use, so I hobble back to camp. The men have started the gas stove to get breakfast and I stand over it, first one foot, then the other, over the blaze, my teeth chattering. Then my stomach gives a lurch (breathing gas fumes) and I hastily retire to the tent, dejectedly wondering if the trips are worth it. Now the sun finally manages to get up over the mountain top and the tent begins to warm up slightly and I doze off. The call, "Come and get it" awakens me and we eat our breakfast of eggs and bacon, bread and hot coffee. Things begin to look more cheerful and the sun feels mighty good. The hardy geologist has been out and brought back a bunch of fine specimens which we spread out upon the ground and eagerly examine. We are all pepped up now and "rarin' to go."

Shedding one of the coats, I start off to collect psilomelane. It is thrilling now. You walk about picking up beautiful specimens on all sides. The common ones you leave for a later trip. The knap-sack is full so back to the car to empty it into a wooden box; we brought along four boxes to fill. The men drive the car over—too dark last night—and go off to explore, while I continue collecting. I shed the jacket. My back is beginning to ache from constant stooping but never mind that. I'm still too thrilled to care. Two more knapsacks full. It is now nine o'clock and getting really hot. I retire behind the car (after carefully inspecting the surrounding hills and desert, wondering just where the men are) and shed all my clothes but my slacks and shirt; the shirt is now worn tails hanging out—cooler that way. I also roll my hose down to the tops of my high top canvas shoes, take a drink of Cola out of ice box and proceed with my collecting.

That is your desert day. Hot!

By eleven o'clock we have the four boxes full and decide to break camp and hunt other fields. We are hot and tired anyway and our backs ache. The thought of sitting for a while appeals; and so we start back West and after a long, warm ride we reach Nut Hill where the concretions are supposed to be. Diligent search fails to reveal any worth while; you must find just the right spot and dig; so, deciding to leave that for a future trip, we go on. By four o'clock we

again reach Cedarville and fill up on gas and iced Cola (you figure it out) and drive on down the valley to one of the canyon washes; pick out any canyon that looks interesting and hunt up the wash and into the canyon and you are sure to find something of interest. We find heulandite, tiny coffin shaped crystals in a rotten tuff, chabazite crystals, chalcedony and one nice piece of black agate. Also some interesting augite. It is getting too dark to hunt now so back we go to the car and really start for home. Supper at Alturas and then on home, ariving there at one o'clock Monday morning, sleepy but well satisfied.

And then you spend all the next day cleaning up yourselves and the mess—the housewife does, the man of the family of course goes to work to earn enuf to cover next Sunday's trip. Tired from two nights' lack of sufficient sleep, you wash and sort and pack away rocks, repacking and replenishing the paraphernalia, house dirty, you dirty, everything dirty and you decide that this is just a little too much; no sense in going every Sunday; you'll go collecting say just once a month hereafter. That settles that.

And then a hot bath, hair fixed, house slicked up and a good night's rest and —well, *you just can't wait for next Sunday.*

Do not think that this is a typical trip as far as collecting goes. It is not. Only once or twice in a lifetime does one make such a "find." The rest of the trips are generally "even as yours and mine," often "duds," sometimes fair, sometimes good. Last summer here in southern Oregon, northern California and northwestern Nevada we collected: among the zeolites, heulandite, chabazite, mesolite, phacolite, the rare epidesmine, stilbite and thomsonite; various copper, iron and lead ores; selenite and amorphous gypsum; the rare mercurial tetrahedrite, schwazite; thinolite, travertine and various calcite forms; aragonite; psilomelane, lollingite, "thunder eggs," beach agates and other agates and jaspers, agatized wood and all kinds of volcanic specimens including bentonite in-the-making (collected from active fumeroles) and two other specimens, now being studied by men that know more about them than we do. Pretty good? We think so, and it's lots of fun.

So you see you can be a professional man or woman all week and from five o'clock Saturday until one o'clock Monday morning assume the garb of a rock hound. And it is some garb—when you stick to the same old white hat for five years, because you can't find another so thoroughly satisfactory for shading your face and eyes, for carrying rocks and Indian relics in, watering the dog out of, a hat that you can sleep in and which is even wearable after your husband packs the load on top of it or after the dog curls up on it for a few hour's sleep. Did you ever have one like that?

New Educational Motion Picture Films Tell Story of Making and Shaping of Steel

The story of the making of steel and its fabrication into commercial shapes and products is interestingly shown in a new motion picture film produced under the supervision of the U. S. Bureau of Mines in cooperation with one of the large steel companies. This film is of the "silent" type and is divided into seven separate one-reel subjects. It is the latest addition to the film library of the Bureau of Mines that now consists of about 4,000 reels, which were shown on 96,500 occasions to an audience of about ten million persons during 1939.

Copies of these films in 16-millimeter size may be had for exhibition by mineral clubs, schools, churches, colleges, civic and business organizations, and others interested. Applications for the films should be addressed to the Bureau of Mines Experiment Station, 4800 Forbes St., Pittsburgh, Penna. No charge is made for the use of the films, although the exhibitor is expected to pay transportation charges and for loss or damage other than ordinary wear and tear.

NEW ENGLAND NOTES

Conducted by Rudolf C. B. Bartsch
36 Harrison St., Brookline, Mass.

Westmoreland, N. H. Just a warning note to the collectors who have never visited the fluorite mine in this town. The mine has been inactive for over two years and the dumps which were never very large are at present non-existant. Very little if anything can be found and the mine itself has been filled with water ever since the shut-down. The oldest working, higher up on the mountain, is caving in badly and caution should be used on nearing the edges of the old shaft.

Albany, Me. The Bumpus mine or quarry is an exceedingly interesting place to visit. But do not expect to do any collecting. The locality is noted for its fine colored rose quartz and enormous beryls. If by any chance you should drop your "uppers" with its glistering row of parallel "crystals," it is doubtful if you could get them back without first laying a five spot on the old apple stump. And further, if you do decide to purchase a rose quartz specimen, have them show you dry material from the house. Many of the specimens displayed out doors will be quite disappointing when you get them home and dried.

Amherst, N. H. The granite quarry at this location is a good place to visit. Very few collectors visit this locality mainly because they expect it is like the granite quarries in Milford and Brookline, N. H. This, however, is not the case. The number of species is of course limited but excellent specimens can be obtained of those that are to be found here. Microcline crystals of both the Carlsbad and Baveno twin types can be secured in excellent terminated specimens. Fine terminated oligoclase crystals showing albitic twinning are plentiful. Excellent specimens of granular magnetite with microcline and oligoclase are to be secured as well as fine pyrrhotite in the same matrix.

Portland, Conn. The Boston Mineral Club held its first field trip of the current year at the Strickland quarry and the adjacent Schoonmaker mine on Collins Hill, near Portland, Conn., on Sunday, April 21st. The day started with a light drizzle and wound-up with snow and sleet late in the afternoon.

The material on the dumps was bright and clean after the previous day's downpour and many fine minerals were plainly visible. The new waste material brought to light many minerals that have been listed as rare. An excellent specimen of amblygonite was found, also some nice crystals of bertrandite in cavities in feldspar, many fine pieces of pink beryl showing the usual zoning, some very fine specimens of deep orange-red lithiophilite in quartz, black sphalerite xls in quartz and an unusually large cavity filled with salmon-red rhodochrosite with masses of micro xls.

The usual minerals of this locality are now available in excellent material with the exception of lepidolite which seems to be scarce at the present time and this also accounts for the scarcity of colored tourmalines. Spodumene is also uncommon except for its alteration product pinite which is plentiful in various shades of green and brown.

All of the above mentioned material was found on the Schoonmaker dump as this is the only operation now working. The Strickland quarry is still idle but the dumps are now being combed over for mica scrap and some interesting specimens are coming to light and when they get in deeper the "pickings" may become better.

The New Haven Club was supposed to hold its field trip to this locality on the same day but it must have more "fair weather" collectors for the Boston Club outnumbered them five to one even though the members of the latter club had to travel four times as far.

All in all those that attended were well pleased with their finds and the Collins Hill localities are still very much worth while.

. . Collectors' Tales . .

By PETER ZODAC

DON'T TRUST A COLLECTOR

On Sunday, September 8, 1935, a party of five collectors visited the Rock Landing pegmatite quarry near the Connecticut River in central Connecticut. Those in the party were Carl Klein, Henry Thurston and son, David, R. Emmet Doherty and the writer.

We did not find anything of interest in the line of minerals and were just about to leave when some one spotted a huge hornet's nest high up along the face of the quarry wall.

"We can't leave that up there," said Emmet, "it just has to come down."

So a council of war was held and it was decided that we would leave the doors of the car wide open (the car was in the center of the quarry which was about 150 feet in diameter) while we were to throw stones at the nest. The instant the nest was hit, we would all dash into the car and close the doors after us.

A good idea but before we started to put it into action Carl and the Thurstons withdrew from active participation. They would wait in the car for us.

Emmet and I therefore went forth bravely to battle with the enemy. There were tons of ammunition all over the quarry which was a good thing for us as our marksmanship was very poor. We kept bombarding the quarry wall for 10 or 15 minutes when suddenly a cry of victory arose.

"A bull's eye! It's falling! Run for your life!"

We dropped everything and ran wildly for the car and safety. But horrors! The doors were all locked and our wild pleas and entreaties to be let in were all in vain. The three "bozos" inside would not even budge; they just sat still and grinned at us.

It was not the time to argue and with a cry of rage we turned around and dashed wildly out of the quarry and down the road with the hornets in mad pursuit. We must have broken all records for the distance covered, about a quarter-mile, for when we fell exhausted not a single hornet had caught up with us nor were any in sight.

The moral of this tale is never to trust a collector even if he is a good friend of yours.

DO NOT FORGET

that Monday, June 17th, 1940, is your day at the New York World's Fair. This will be no small event for it is expected that many thousands of mineralogists and those interested in minerals will be there that day. Special displays of minerals and of gems and jewels will feature this occasion.

See page 189 for official instructions.

CALIFORNIA CONCLAVE AT SANTA BARBARA

By CLARK HARRISON

The California Federation of Mineralogical Societies held its fifth annual convention in the Museum of Natural History of Santa Barbara, California, Saturday and Sunday, April 20-21, 1940.

It was the biggest meet the Federation has yet staged, the attendance exceeding 1100. One of the largest and finest collections of minerals ever assembled in this country was exhibited. The Santa Barbara Mineral Society, with C. D. Woodhouse as president, was host to the visitors.

In the Museum auditorium was displayed both amateur and commercial exhibits, including the vast array of mineral wealth of California as well as rare gems and minerals from other parts of the world.

Interest is running high in the earth sciences in California, and many new mineral societies are being formed. One of the leading societies—the Pacific Mineral Society, Inc.—walked off with top honors, winning three of the prizes: Henry Ringwald for his fine polished cabachon set; W. T. Underwood for finding the best crystal specimen of the year (a large selenite crystal from Death Valley, Calif., showing perfect crystal faces); W. Hurd for his finely polished large specimens. All three are Los Angeles lapidists, of amateur standing.

Among other exhibits were the fine polished stones (skillfully set in hand-carved wood) of Albert Quensel of Santa Barbara. He made much of the miniature furniture for the miniature rooms shown at the San Francisco Fair by Mrs. Oakleigh Thorne. A. A. Dixon of Gold Hill, Oregon, exhibited an unusual frame of rainbow agates, cut to exacting thickness, so that the rainbow iridescence was brought out when held up to the light. T. W. Warner, Jr. of Pasadena, displayed a 35 pound topaz from Brazil, as well as pictures of birds, flowers and butterflies made of cut and polished tourmalines found in San Diego county, Calif. Wendall Stewart and Cecil Calvert displayed rare specimens they found in Mexico last December, which included fire and cherry opals, apatite with phantom shadows, and extra large selenite crystals. There was an unusual collection of large specimens of fluorescent minerals for dark room demonstration. The Museum Geology Department was open both days, which contains fine specimens of gems and minerals from different parts of the world, including the well known opal collection of C. D. Woodhouse.

A sightseeing and garden tour was conducted through the city and the beautiful suburban estate community, Montecito. Santa Barbara, world famous resort, and often called the American Riviera, is situated where rugged mountains meet the Pacific Ocean, and is famed for its fine homes and estates, ranches, flowers, rock gardens, Spanish architecture, Old World charm and fascination, old Mission, ideal climate, etc.

A separate building housed the latest lapidary equipment, where a Lapidary Round Table offered lectures and discussions. Much time was devoted to trading and selling specimens.

The Federation's annual banquet was held Saturday evening at the world famous Restuarante del Paseo, being attended by 340. A mineral auction was held, prizes awarded to exhibitors and music and entertainment furnished. Addresses were given by Mayor Maher; Major Max Fleischmann, head of the Museum; John Renshaw, organizer of the first California mineral society; Edwin Van Amringe, secretary of the first society; C. MacIntosh, one of the charter members of the first society; and Fred Young, business manager of *Mineralogist Magazine* of Portland, Oregon. A standing tribute was paid to John Melhase (whose widow was present), one of the founders of the Federation, and its first president. Mr. Melhase, formerly of Berkeley, passed away April 9, 1938. His memory is revered because

of his tireless efforts, unlimited time, and many sacrifices which made it possible for the advancement of California mineral societies.

It was announced that the Golden Bear Nugget had become the sole property of the Federation and would remain its official insignia. It is not really a nugget at all but an amorphous gold mass containing two large perfect octahedral crytals, not commonly seen. It is something like 2x4 inches in size, and resembles a standing bear. It was found under a sluice box in 1857 by a 14 year old girl, who kept it until she died at the age of 74, when it passed on to a descendant. Over a year ago Mr. C. D. Woodhouse of Santa Barbara purchased it and reserved it for the Federation.

The newly elected officials are: C. D. Woodhouse of Santa Barbara, president; Paul vanderEicke of Bakersfield, vice-president; and Kenneth Garner of San Bernardino secretary-treasurer. The 1941 convention will be held at Oakland, California.

CLUB AND SOCIETY NOTES

Bay State Mineral Society

On Fri., April 19th, the Society held its first field trip for 1940 to Newbury, Mass., where the famous old Chipman silver mine (now abandoned) was visited. The following minerals were collected at the mine: chalcopyrite, galena, kaolin, siderite and serpentine.

Another famous locality, also in Newbury, is "Devil's Den", which was also visited the same day and andradite, asbestos, serpentine and wollastonite collected.

The trip was a grand success; 12 members were in the party.

Mineralogical Society of Hartford

Two field trips will be held in June by the Society. The first will be to the garnet and siderite mines near Roxbury, Conn., on the 9th; the second will be to the quartz locality at West Stafford, Conn., on the 30th.

Meeting place for both trips will be 249 High St., Hartford, Conn. Contact Mrs. R. F. Hills, 35 Manchester St., Hartford, Conn., regarding time of departure. Bring lunch.

New Haven Mineral Club

The third field trip of the year will be held on Sunday, June 16th, to Gilllette's and Rock Landing Pegmatite quarries at Haddam Neck, Conn. The Gillette quarry, abandoned for many years, was famous for its fine tourmalines.

Ohio Gemologists Visit Museum

Members of the Northern Ohio Guild of the American Gem Society took advantage of a fine spring day and traveled from all parts of the state to visit the Cleveland Museum of Art on Sunday, April 27th.

After a series of slides on Ancient and Modern jewel designs had been shown by Clayton Allbery, Secretary of the Guild, the members viewed the fascinating jewels on display in the Museum and inspected various interesting books on the subject.

President Carolyn requests that as many members as possible attend the May meeting to cast their vote for the officers for the coming year.

BIBLIOGRAPHICAL NOTES

THE BOOK OF DIAMONDS

Their curious lore, properties, tests and synthetic manufacture. By J. Willard Hershey, M. S., Ph.D., Department of Chemistry, McPherson College.

In the foreword of his interesting new book, Dr. Hershey says in part; "The author has endeavored to cover the subject of diamonds and some of the precious gems in a very brief, popular way, from their very earliest history to the present." The contents of the book may be briefly described as follows:

Chapter 1. *The Early History of Diamonds*: The diamond was first known in India, at least 5,000 years ago, and from that country it spread westward to Europe and Africa. Early diamonds were rated below the ruby and the emerald because it was not possible to cut and polish them to their full advantage.

Chapter 2. *Superstition and Religious Uses of the Precious Stones*. Gems were believed to possess miraculous powers and virtues. The diamond, for instance, had the power of averting insanity and rendering poison harmless; and in the Middle Ages it was known as the peacemake between husband and wife.

Chapter 3. *Indian Diamonds*. Dr. Hershey says that as far as we know diamonds were first found in Central India. The diamond mines were small diggings which in the ea ly days gave employment to a large number of people; now the industry has declined greatly, producing only a few stones a year.

Chapter 4. *Brazilian Diamonds*. Diamonds were discovered in Brazil in 1725 by natives while washing sands for gold. The author gives an interesting description of the methods used in mining for diamonds.

Chapters 5-6. *South African Diamonds*. The first discovery of diamonds in South Africa was made in 1867 by W. G. Atherstone who identified as a diamond a pebble found by a child on a farm on the southern banks of the Orange River. This was followed by other finds until today South Africa p oduces about 98% of the world's output of diamonds.

Chapter 7. *Diamonds Found in Other Parts of the World*. Diamonds occur in the United States, British Guiana, Russia, China, Sumatra and Australia.

Chapter 8. *Properties and Tests for Diamonds*. A new method for testing the quality of diamonds, invented by M. Malaval of Paris, is with ultraviolet light rays passed through a screen. The purest white stones give the clearest picture, yellow stones showing darker, while imitation diamonds show quite black.

Chapter 9. *Cutting Diamonds*. In the rough a diamond is a very homely object—it looks like a piece of broken glass. But, when cut into its standard 58 facets and polished, it becomes a stone of marvellous beauty and brilliance.

Chapters 10-12. *Remarkable diamonds and Gems*. Among the great diamonds of the world are the Orloff, Koh-i-nur, Great Mogul, Braganza, Nizam, Hope, Pitt, Cullinan, Jonker, Florentine.

Chapter 13. *The Buying and Uses of Diamonds*. A diamond is one of the best investments one can make. It will not only serve to please its purchaser through its beauty and brilliance but its value will not deteriorate.

Chapter 14. *How to Make Synthetic Diamonds*. The author describes a method for manufacturing synthetic diamonds; unfortunately, tests made by the Gemological Society of America did not confirm the authenticity of any of his synthetic diamonds.

The Book of Diamonds is published by the Chemical Publishing Co., Inc., 148 Lafayette St., New York, N. Y. 142 pp., 4 figs., 3 pls (one in color), price $2.00.

Fabricated Diagrams: By Ronald L. Ives, Vice-President, Rocks and Minerals Association.

Diagrams and maps of superior quality may be produced speedily and at low cost by the use of Ben Day screens, multitone papers, transfer patterns and set type. Descriptions of these manufactured aids, of their uses and limitations, are outlined in the article. *The Journal of Geology*, Vol. XLVII, No. 5, July-August, 1939, pp. 517-545, Urbana, Illinois.

The Lure of Cave Lore: By Thomas Allen Musseaus.

Being a random narrative upon caverns in general and in particular the properties of the Skyline Caverns, Front Royal, Va. 65 pp., 16 illus., 3 figs.

We heartily recommend this very interesting bulletin to our readers and though its price is not quoted we believe copies may be obtained at nominal cost from Mr. Musseaus, whose address is Limeton, Va.

Bargain List of Mineral Specimens, Student Pound Material, Marble Specimens, Mineralogical Supplies, Models and Fossils.

Items covered are overstocked, discontinued or slightly damaged which are drastically reduced in price for quick disposal. 12 pp.

Issued by Ward's Natural Science Est., Inc., P. O. Box 24, Beachwood Sta., Rochester, N. Y.